



Developing a Cost Model

VLHC Magnet Technologies Workshop

Workshop II

Fermilab, May 24 - 26, 2000

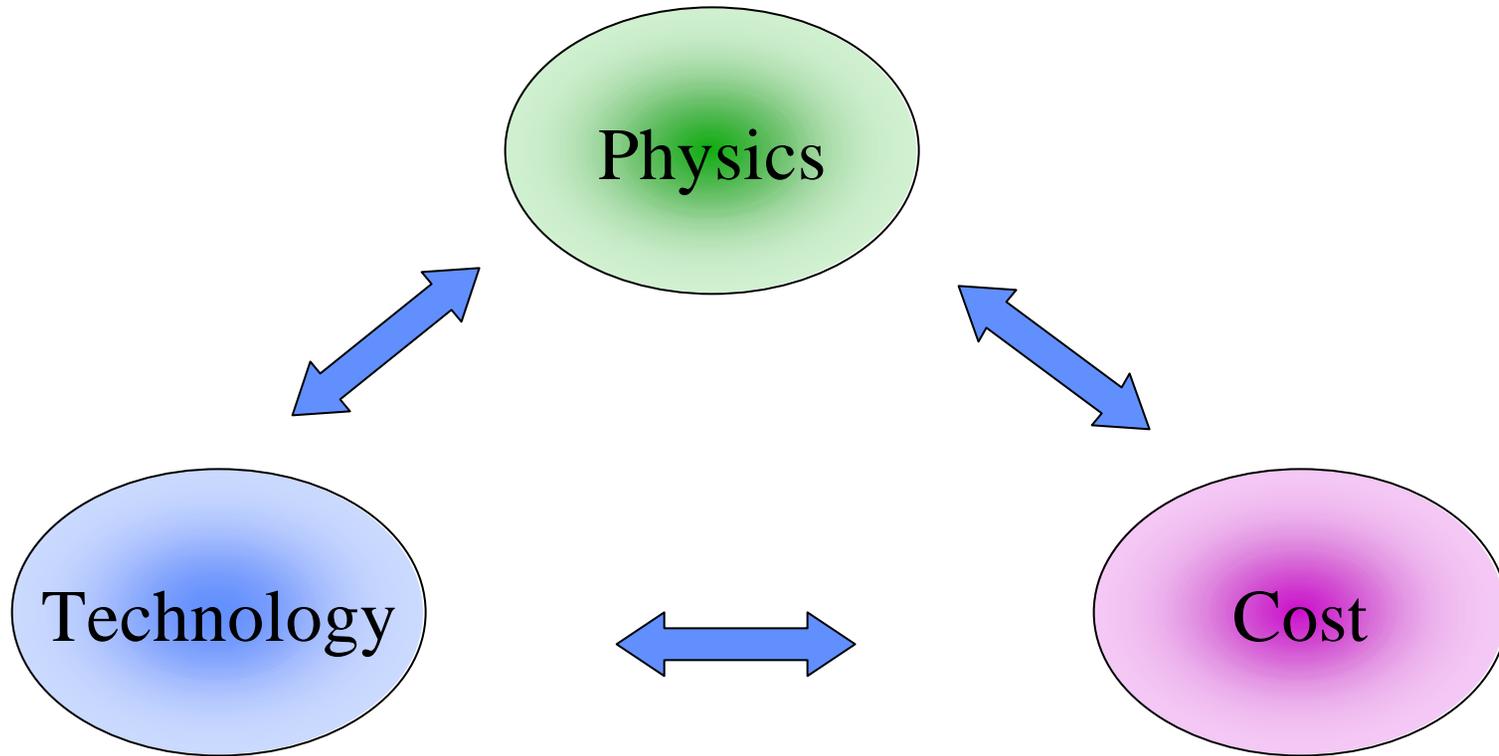
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What do we need?

Requirements evolve with time

- Phase I Guideline for R&D
 - Identify areas of potential cost savings within a specific technology
- Phase II Technology choice
- Phase III Final project cost
 - Project cost optimization



How do we proceed?

- Develop standardized database/WBS structure
 - Sufficiently subdivided for relative comparisons of component costs
 - A solid framework that accommodates diverse technologies
 - Must evolve according to our needs

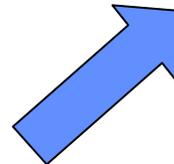
- Start by defining the end product

- Allows us to build coherently

If it's too cumbersome
it won't be useful

But

- Extreme detail not required initially
- Start small and extend later





Getting Started

- Generate a working baseline
 - Parameter list
 - Define machine characteristics (physics goals, energy, basic field quality, etc.) Job for the steering committee/AP folks
 - Bore size - machine dependent? May need arbitration on some parameters
 - Set constraints
 - e.g. FNAL as site
 - Define operating margin. Operating current is not short sample
- Avoid scaling in most cases - concentrate on specific niches
 - Technologies are discrete in their dependence on machine design
 - Get beyond hand-waving comparisons



Getting Started (con't)

- Cost Basis
 - Labor
 - Conductor
 - Materials
 - etc
- Define generic, scalable costs for some items
 - e.g. interfaces (complexity penalty)
- Standardize overhead or use percentages
- Include technology dependent add-ons
 - e.g. Beam screens



Later On

- Develop links to accelerator subsystems
 - Other magnets (quads, IR's, correctors, etc.)
 - Cryo
 - Civil
 - Controls
 - Quench Protection
 - Installation
 - RF, Ramping power supplies, etc.
 - Injector complex
 - Need their own parameter lists (magnet technology dependent)
- Incorporate intangible factors
 - Technological and fabrication risk
 - Reliability



Participation and Scope

- Needs reps from each candidate technology to provide specific information that will be inserted into the model at the roll-up levels
- Should cover all possible technology candidates
 - No one for medium field NbTi?
- Potentially very complex. Keep it simple and evolve slowly
 - Above all, avoid discussing absolute numbers



Summary

- The maturity and eventual viability of any of the new or existing magnet technologies (beyond SSC or LHC) requires focusing resources and money on some particular aspect(s) of the proposed design
 - Reduce overall cost, increase reliability, etc.
- A dependable and coherent cost model can help determine where best to direct the effort